Claims

1. A resin coating method of an inert member which is a method of applying a resin to an insert member surface by insert molding, the method comprising a preheating step of heating the insert member to a predetermined temperature within a range of from 40°C to a melt injection temperature of the resin and a mold for insert molding to a predetermined temperature within a range of from 40°C to (melt injection temperature of the resin - 50°C); an insert molding step of injecting a molten resin in a state that the preheated insert member is positioned in the preheated mold for insert molding; a holding step of holding a molding in the mold; and a cooling step of taking the insert molding out of the mold, and gradually cooling the same to room temperature.

2. The resin coating method as claimed in claim 1, wherein the insert member is at least one selected from metals, ceramics or their composite members.

3. The resin coating method as claimed in claim 1 or 2, wherein the resin is a thermoplastic resin, and is at least one selected from the group of a homopolymer, a copolymer, a polymer blend, a polymer alloy, and a composite material comprising a polymer as a main component.

4. The resin coating method as claimed in any one of claims 1 to 3, wherein the resin applied to the surface of the insert member has a thickness in a range of from 5 μm to 30 mm.

5. The resin coating method as claimed in any one of claims 1 to 4, wherein the insert member is previously surface-treated with at least one selected from a polishing treatment, an etching treatment, a shot blast treatment and a silane-coupling treatment.

6. An insert molding which is a molding obtained by the resin coating method as claimed in any one of claims 1 to 5, wherein the molding does not generate resin crack in an air atmosphere of a temperature range of from -40°C to 200°C.

7. An insert molding which is a molding obtained by the resin coating method as claimed in any one of claims 1 to 5, wherein the molding does not generate resin crack or resin peeling in water of a temperature range of from 0°C to 100°C.

8. A resin coating method of metal gears which is a method of applying a

resin to a surface of the metal gears, the method comprising a preheating step of heating the metal gears to a predetermined temperature within a range of from 40°C to a melt injection temperature of the resin and a mold for molding to a predetermined temperature within a range of from 40°C to (melt injection temperature of the resin - 50°C); a molding step of injecting a molten resin in a state that the preheated metal gears are positioned in the preheated mold; a holding step of holding a molding in the mold; and a cooling step of taking the molding out of the mold, and gradually cooling the same to room temperature.

9. The resin coating method of metal gears as claimed in claim 8, wherein the metal gears are a metal gear for transmitting power and/or angle of rotation, or metal splines and serration, for transmitting power.

10. The resin coating method as claimed in claim 8 or 9, wherein the metal gears are at least one selected from steel, iron, copper, aluminum, titanium, or alloys containing those, or their composite members.

11. The resin coating method as claimed in any one of claims 8 to 10, wherein the resin is a thermoplastic resin, and is at least one selected from the group of a homopolymer, a copolymer, a polymer blend, a polymer alloy, and a composite material comprising a polymer as a main component.

12. The resin coating method as claimed in any one of claims 8 to 11, wherein the resin applied to the surface of the insert member has a thickness in a range of from 5 μm to 30 mm, and can be molded in an optional thickness at each site of gear surface.

13. The resin coating method as claimed in any one of claims 8 to 12, wherein the metal gears are previously surface-treated with at least one selected from a polishing treatment, an etching treatment, a shot blast treatment, a roulette processing and a silane-coupling treatment.

14. Resin-coated metal gears which are a molding obtained by the resin coating method as claimed in any one of claims 8 to 13, wherein the molding is free from orientation of resin after molding, and has suppressed resin crack and resin peeling.

15. Resin-coated metal gears comprising two gears constituting a pair of gears that transmit power and/or angle of rotation by contact rotating tooth portions thereof, wherein all tooth surfaces of the two gears comprise a molding obtained by the resin coating method as claimed in any one of claims 8 to 13, or all tooth surfaces (tooth contact sites) of one gear comprises a molding obtained

by the resin coating method as claimed in any one of claims 8 to 13, and another gear intermeshing with the one gear is a non-resin-coated metal gear.

16. Resin-coated metal gears obtained by the resin coating method as claimed in any one of claims 8 to 13, wherein when a part of tooth surface is coated with a resin, tooth surface of another gear contacting and intermeshing with non-resin-coated tooth surface of the gear is coated with a resin.

17. Resin-coated metal gears obtained by the resin coating method as claimed in any one of claims 8 to 13, having impact resistance far superior to that of a resin-made gear.

18. Resin-coated metal gears obtained by the resin coating method as claimed in any one of claims 8 to 13, having fatigue resistance far superior to that of a resin-made gear.

19. Resin-coated metal gears obtained by the resin coating method as claimed in any one of claims 8 to 13, having lubricating properties and wear resistance far superior to those of a combination of two metal gears when used under non-lubrication in the combination of gears as claimed in claim 15 or 16.

20. Resin-coated metal gears obtained by the resin coating method as claimed in any one of claims 8 to 13, having excellent noise reducing properties such that noises due to contact of the gears at the tooth surface thereof is greatly reduced than noises due to contact of metal gears at the tooth surface thereof, in the case of using in the combination of gears as claimed in claim 15 or 16.